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| APPLICATION NO.   | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|---|-------------|----------------------|---------------------|------------------|
| 10/655,367  | 09/04/2003  | Michael Norman Day   | AUS920020474US1     | 8438             |
| 45327   | 7590        | 10/21/2005           | EXAMINER            |                  |
| IBM CORPORATION (CS)<br>C/O CARR LLP<br>670 FOUNDERS SQUARE<br>900 JACKSON STREET<br>DALLAS, TX 75202 |             |                      | DOAN, DUC T         |                  |
|   |             |                      | ART UNIT            | PAPER NUMBER     |
|   |             |                      | 2188                |                  |

DATE MAILED: 10/21/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

10/655,367

Applicant(s)

DAY ET AL.

Examiner

Duc T. Doan

Art Unit

2188

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 03 October 2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-21 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-21 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)  | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date <u>10/3/2005</u> | 6) <input type="checkbox"/> Other: _____  |

## **DETAILED ACTION**

### ***Status of Claims***

Claims 1-21 are in the application.

Claims 1-21 are rejected.

### ***Claim Objections***

Claim 13 is objected to because of the following informalities:

As per claim 13, the recitation “the second cache” lacks antecedent basis. Furthermore, in light of the specification page 20 lines 21-32, Examiner interprets the claim as following:  
“..step of retrieving the data associated with an address from the cache if there is a **miss** in the cache”

Appropriate correction is required.

### ***Double Patenting***

Claim 1 are provisionally rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claim 1 of copending application 10/655365, This is a provisional obviousness-type double patenting rejection because the conflicting claims have not in fact been patented.

|   |   |
|---|---|
| Instant Application, 10/655367; Claim 1       | Copending Application, 10/655365; Claim 1     |
| A software controlled data replacement system | A software controlled data replacement system |

|   |   |
|---|---|
| for a cache, the system employing a class identifier and a tag replacement control indicia, comprising:   | for a cache, the system employing a <b>memory region</b> and <b>associated</b> class identifier and a tag replacement control indicia, comprising:                            |
| a replacement management table, employable to read the class identifier to create the tag replacement control indicia; and  | a replacement management table, employable to read the class identifier to create the tag replacement control indicia; and  |
| the cache, comprising a plurality of sets, employable to disable a replacement of at least one of the plurality of sets as a function of the tag replacement control indicia. | the cache, comprising a plurality of sets, employable to disable a replacement of at least one of the plurality of sets as a function of the tag replacement control indicia. |

***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

A person shall be entitled to a patent unless -

(a) the invention was known or used by other's in this country or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent.

Claims 1-21 rejected under 35 U.S.C. 102 (e) as being anticipated by Arimilli et al (US 6425058).

As for claim 1, Arimilli describes a software controlled data replacement system for a cache, the system employing a memory region and associated class identifier and a tag replacement control indicia (Arimilli's column 7 lines 5-55), comprising: a replacement management table (Arimilli's Fig 5, Fig 7; column 6 lines 1-27 describes virtual caches management whereas each virtual cache element, "a row", is further partitioned into multiple types and set associative), employable to read the class identifier (virtual caches ID) to create the tag replacement control indicia (Fig 7: #130 a virtual cache's ITF setting to information type field) (Arimilli's Fig 5, 7; column 5 line 65 to column 6 line 27 describes using virtual cache value in control register 132 to select a virtual cache's ITF setting; the ITF setting determines cache partitioning and set associative for replacement of data in a virtual cache; Arimilli's column 6 lines 53-66 further describes using virtual caches' performance to determine the replacing of virtual caches) , and the cache, comprising a plurality of sets, employable to disable a replacement of at least one of the plurality of sets as a function of the tag replacement control indicia (Arimilli's Fig 5, column 6 lines 5-27 describes the virtual caches' sets can be managed to be overlapped or disjointed).

As for claims 2-3, Arimilli describes wherein a set of the cache is replaced based upon a least recently used function (claim 2; column 9 lines 30-45); wherein the replacement management table is software-based ( Amirilli's column 5 lines 1-28; column 9 lines 30-45 describe virtual caches having information type fields to control the partitioning and the replacement of cache sets; Arimilli's column 6 lines 2-33 further describes the type field information are determined by software.

As for claims 4-6, the claims recite a range register employable to create the class identifier (claim 4); wherein the range register is employable to classify an address range as a default address range (claim 5); wherein the range register is written to by software (claim 6). Arimilli's column 7 lines 30-49 describe the information type having information such as ranges of memory areas. Arimilli's column 7 lines 50-54 describe the memory location information is recorded in memory cache controller. Arimilli's column 8 lines 5-14 describe the type information having a default value; Arimilli's column 6 lines 2-33 further describes the type field information are determined by software.

As for claim 7 the claim recites wherein the range register receives the address as a result of a miss of an address. Arimilli's column 9 lines 1-27 describe any cache policy, characteristic and behavior that is subjected to programming or dynamic hardware management can be independently tuned for a particular information type. Arimill's column 8 lines 5-15 describe the information field is provided with a programmable default value. Thus in a situation wherein the cache controller does not received an address that match that of the range register, the default value is used.

As for claim 8, Arimilli describes method of determining information replacement in a cache, comprising: creating a class identifier; reading the class identifier; creating a tag replacement control indicia as a function of the class identifier through employment of a replacement management table (Arimilli's Fig 5, Fig 7; column 6 lines 1-27 describes virtual caches management whereas each virtual cache element, "a row", is further partitioned into multiple types and set associative); and configuring replacement eligibility of a set in a cache as a function of the associated tag replacement control indicia (Fig 7: #130 a virtual cache's ITF setting to information type field; Arimilli's Fig 5, 7; column 5 line 65 to column 6 line 27 describes using virtual cache value in control register 132 to select a virtual cache's ITF setting; the ITF setting determines cache partitioning and set associative for replacement of data in a virtual cache).

As for claim 9, the claim rejected based on the same rationale as in the rejection of claim 2.

As for claim 8, the claim recites replacing information within the set of the cache with other information as a function of the tag replacement control indicia. Arimilli describes in column 9 lines 1-10 the information type field is flexible and dynamically tuned for a particular information type. Arimilli's column 9 lines 13-26 describes the information in type fields associated with the sets within the congruence class is further examined by the memory controller to determine which sets is permitted to store the information type of received information.

As for claim 11, the claim recites creating a classID (virtual cache identifier) further comprises creating a non-default classID if a hit of an address occurs in a range register.

Arimilli's column 9 lines 27-43 describe the cache controller apply different LRU schemes for each virtual cache. Thus a particular virtual cache identifier is generated when the cache controller receives a request that matching the virtual cache's address range that was provided by the information type field for the particular virtual cache (Arimilli's column 9 lines 12-26).

As for claim 12, the claim recites discarding the tag replacement control indicia if there is a hit on the cache. It has been well know in the art that for a cache hit, the replacement is not carried out.

As for claim 13, the claim recites the step of retrieving the data associated with an address from the second cache if there is a hit in the second cache.

As for claim 14, the claim rejected based on the same rationale as in the rejection of claim 2.

As for claim 15, Arimilli's describes employing an address range to associate with the class identifier (Arimilli's column 9 lines 13-45 describes virtual caches associating with regions of memory such as OS kernel data etc..).

As for claim 16, the claim recites employing an algorithm bit to select an algorithm for the replacement of the eligible set. Arimilli's column 9 lines 3-45 describes that different LRU policies are implemented with virtual caches using the contents of information type. Therefore the information about different LRU algorithms must be provided in the information type field as shown in Fig 3.

Claim 17 rejected based on the same rationale as in the rejection of claim 8.

Claim 18,21 rejected based on the same rationale as in the rejection of claim 10.

Claim 19 rejected based on the same rationale as in the rejection of claim 11.

*Conclusion*

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Loen (US 6430667).

Arimilli et al (US 6430656).

Yoshioka et al (US 5796978).

When responding to the office action, Applicant is advised to provide the examiner with the line numbers and page numbers in the application and/or references cited to assist examiner to locate the appropriate paragraphs.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Duc T. Doan whose telephone number is 571-272-4171. The examiner can normally be reached on M-F 8:00 AM 05:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mano Padmanabhan can be reached on 571-272-4210. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

**Kevin L. Ellis**  
**Primary Examiner**

